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(71) Applicant (for all designated States except US): ARCTIC MEDICAL AS [NO/NO]; Dyrborgveien 8, N-7018 Trondheim (NO).

(72) Inventors; and

(75) Inventors/Applicants (for US only): LEIVSETH, Gunnar [NO/NO]; Dyrborgveien 8, N-7018 Trondheim (NO). OLSEN, Ole [NO/NO]; Fiolveien 27, N-3970 Langesund (NO).

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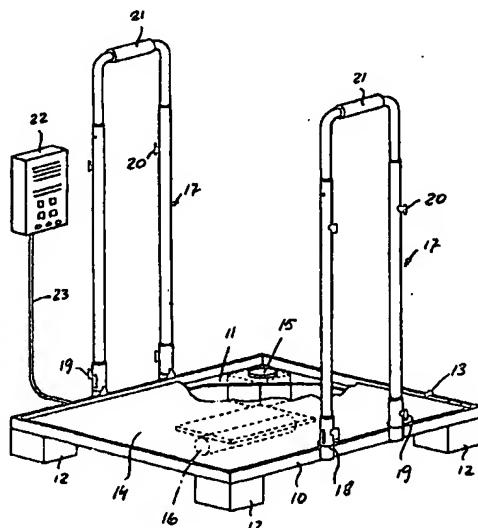
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(54) Title: A DEVICE FOR VIBRATORY STIMULATION ON THE HUMAN BODY



WO 02/053084 A1

(57) Abstract: A device for vibratory stimulation on the human body comprises a support platform (10), a panel (13) supported by said platform and forming a standing surface (14) for a person using the device, and a vibrator (16) for imparting to said panel a vibratory movement. Two standards (17) are mounted to the platform at opposite sides of the panel, forming handles (21) for the person standing on the standing surface between the standards to hold on. A sensor (15) is provided for sensing the load on the panel or on the standards exerted by the person standing on the standing surface (14). A control unit (22) is connected with the sensor and the vibrator for controlling the operation of the vibrator in dependence on the load sensed by the sensor.

Title of the Invention

A device for vibratory stimulation on the human body

5 **Background of the invention****Field of the invention**

This invention relates to a device for vibratory stimulation on the human body.

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Description of the Prior Art

The therapeutic effect of vibratory stimulation on the human body has been well documented. Vibration at low frequencies applied to tissue increases blood circulation 15 due to the increase in capillary dilation. The increased blood flow increases the consumption of oxygen and nutrients by muscles and improves the regeneration process. The result is an improved muscular tone, elasticity and contractile capacity.

20 A prior art device for vibratory stimulation on the human body is marketed under the trade mark PowerPlate™ by Power Plate International, 1181 RP Amstelveen, The Netherlands, comprising a support platform, a panel supported by said platform and forming a standing surface for a person 25 using the device, a vibrator for imparting to said platform a vibratory movement, a standard on the platform for the person standing on the standing surface to hold on, and a control unit for the vibrator.

In the prior art device the standard is located centrally in front of the panel, and the control unit for the 30 vibrator is mounted at the upper end of the standard, where also two laterally projecting handles for the person using the device are provided.

35 The prior art device can be used for rehabilitation and training therapy and provides a neuro-mechanical vibra-

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tory stimulation which is very effective and acts on substantially all tissues and structures in the human body such as neuromuscular systems, circulation, bone structure, hormone system, and neuro transmitters. This influence on 5 the human body provides in a short period of use a considerable increase of the dynamic muscle strength, improved blood circulation, increased fat combustion etc.

Other prior art devices which provide vibratory stimulation are marketed by S. A. I. R., Italy, under the 10 trade mark NEMESTM and by Novotec, Germany, under the trade mark GalileoTM.

The prior art devices mentioned above all have in common that they are relatively heavy, expensive and not easy to disassemble and stow away. The prior art devices 15 have no force measuring ability.

US-A-5 018 510 and US-A-5 046 485 each disclose a scale with a vibrator.

Brief Summary of the Invention

20 A primary object of the invention is to provide an improved device for vibratory stimulation on the human body, which allows a more individual adaptation of the vibratory effect to the constitution of the person using the 25 device.

A further object of the invention is to provide a device of the kind referred to which can be collapsed or disassembled in order more easily to be stored away and transported.

30 These and other objects which will be apparent from the description which follows are achieved by a device for vibratory stimulation on the human body which according to claim 1 comprises a support platform, a panel supported by said platform and forming a standing surface for a person 35 using the device, at least one sensor for sensing the load

on the panel exerted by the person standing on the standing surface, a vibrator for imparting to said panel a vibratory movement, and a control unit for the vibrator, and is characterized in that two standards are provided on the platform at opposite sides of the panel, forming handles for the person standing on the standing surface between the standards to hold on, which allow the person to increase and decrease the load transferred to the panel by the person standing on the standing surface, and that the control unit is connected with said at least one sensor and said vibrator for controlling the operation of the vibrator in dependence on the load sensed by said at least one sensor.

Said at least one sensor can be located between the support platform and the panel to measure the force acting on the platform, or a sensor can be located in each of the two standards to measure the force acting on the standard.

Advantageous further details of the device of the invention are defined in the dependent claims.

20 **Brief Description of the Drawing**

The accompanying drawing discloses a perspective view, partly cut away, of an illustrative embodiment of the device of the invention.

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Detailed Description of the Invention

The device for vibratory stimulation on a human body disclosed in the drawings comprises a rectangular frame 10 of angle bars one flange of the angle bars being horizontal and the other flange projecting vertically therefrom. At the corners triangular metal sheets 11 are connected as by welding with the horizontal flanges. A parallelepipedic block 12 of a vibration attenuating material such as rubber or another elastic material is attached to the lower side

of each metal sheet 11 the four blocks forming supporting feet for the frame.

A rectangular panel 13 forming a plane standing surface 14 for the person using the device is congruent with 5 the frame 10 and is located within the vertical flanges of the frame and is supported by the horizontal flanges of the frame. However, at least one force sensor is located between the panel and the frame, preferably a force sensor 15 is mounted on the upper side of each metal sheet 11, and 10 the panel 13 rests on these force sensors which can be of any suitable type well known in the art.

Frame 10 and panel 13 are not necessarily rectangular. They can have another shape such as oval or circular.

A vibrator 16 which can comprise an electric motor 15 with an unbalanced weight on the shaft thereof or can be of any other suitable type known in the art is mounted to the lower surface of the panel in order to vibrate the same.

Two standards 17 are mounted to the frame 10 at opposite sides of the panel 13, and these standards consist of 20 U-shaped bows. The limbs of the bows are mounted to the frame by means of hinges 18 that allow the standards to be collapsed against the platform, or by connections that allow the standards to be easily disassembled so that the device can easily be stowed away or transported. Means 19 are 25 provided in order to securely lock the standards in the vertical upstanding position shown in the drawing. The limbs are of telescopic construction so that the length thereof can be adjusted, and means 20 are provided in order to securely lock the standards in the adjusted position. 30 Said means 19 and 20 can comprise e. g. screw clamps, spring biased pins engaging matching apertures, or lock means of any other suitable type. At the top each standard is provided with a handle 21 which can be connected to the standard via flexible vibration damping connections, e. g. 35 of rubber, so that vibrations travelling from body to plat-

form, and vice versa, via the arms of the user are minimized.

A control unit 22 is connected by a cable 23 with the vibrator 16 for controlling the operation thereof, and with 5 the force sensor 15 or each of the force sensors, respectively, for receiving signals representing the load on the platform as measured by the sensor.

It is well known that the effect of the vibration on the human body is dependent of the frequency, amplitude, 10 muscle tension, and duration of the vibration, and the control unit shall be constructed for variation of these quantities and for shutting the vibrator on and off manually and also in dependence of the sensed load on the platform.

When the described device is to be used the standards 15 17 are locked in the upright position and the length thereof is adjusted in order to match the tallness of the person who is going to use the device, and are locked in the adjusted position. The person is standing on the standing surface 14 of the panel 13 holding on the handles 21. 20 The standards 17 are used for holding the body in a desired position with the legs bent at a desired knee angle. The weight of the person standing on the standing surface is the load on the panel and will be indicated by the sensor or sensors. However, the standards can be used for adjusting 25 the loading on the panel. If the person standing on the standing surface of the panel pulls the standards and tensions the musculature the loading on the panel will be increased and will be greater than the body weight. If the person pressures against the standards the loading on the 30 panel will be reduced and will be less than the body weight. It is thus possible to train by vibration under "negative" and "positive" loading.

The vibrator is shut on either manually by means of a switch on the control unit, or by means of a photocell

which senses the presence of a person on the panel, and can be started in different manners:

The vibrator is started when the body weight is indicated.

5 The vibrator is started at indication of a weight which is higher than the body weight.

The vibrator is started at indication of a weight which is lower than the body weight.

10 The loading value at which the vibrator is to be started is set by the training person on the control unit, and the vibrator will be automatically stopped if the loading decreases under the value which has been set. An adjustable time delay can be added, so that the person has time to take the proper position after the set force has 15 been achieved, before start of the vibration. The duration of the vibration as well as the frequency and amplitude thereof are also set on the control unit which automatically stops the vibration after the duration set on the control unit has lapsed.

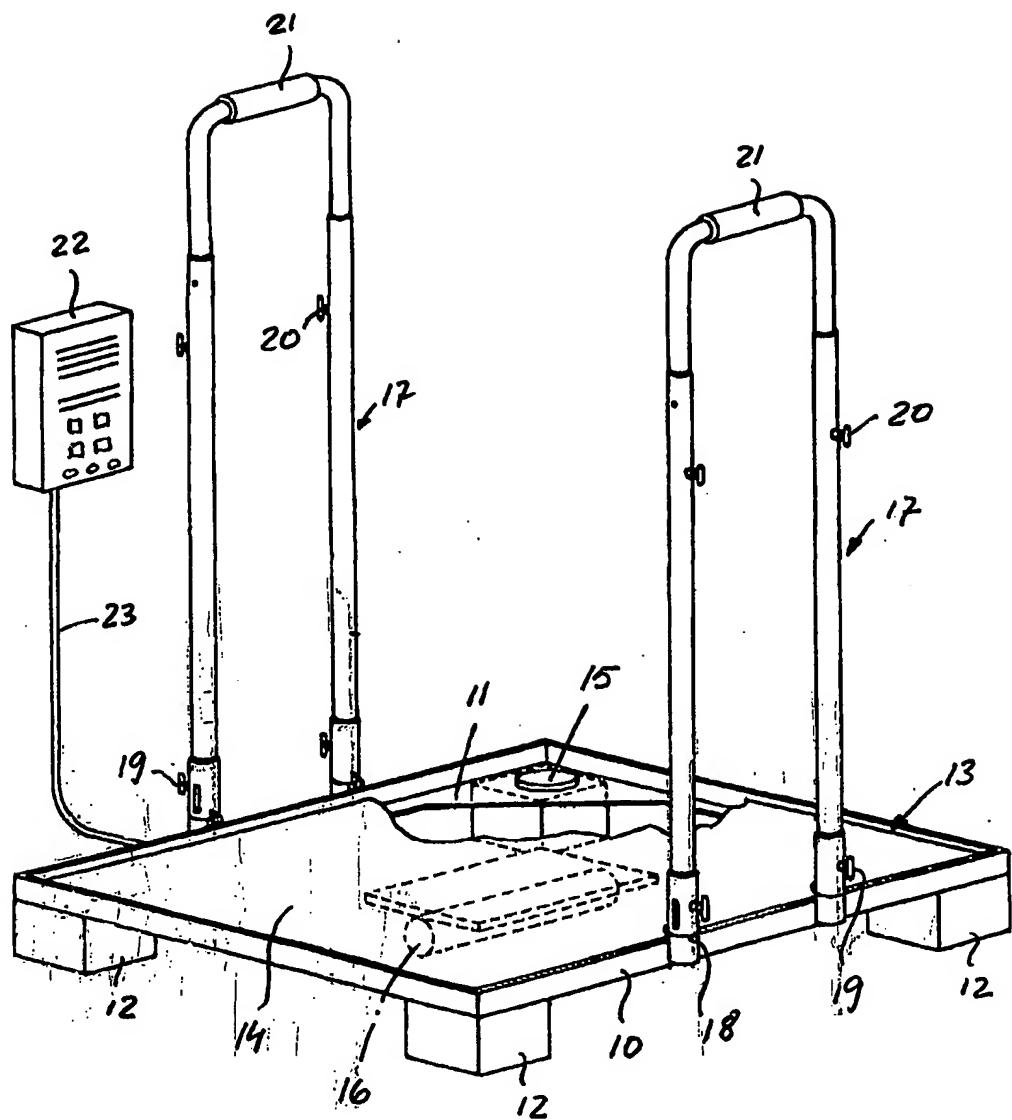
20 The embodiment described is illustrative only. Other embodiments and modifications can be proposed by the skilled man within the scope of the invention as defined in the appended claims. For example, sensors 15 between frame 10 and panel 13 can be replaced by a force-sensing device 25 of the same type as that used in bathroom scales, which comprises a supporting platform with a force transducer integrated therewith according to known technique. Frame 10 supporting the panel which can be integrated with the frame without intermediate sensor(s) is supported on the platform 30 by the feet 12. In this case a reliable load sensing can be achieved by means of a single force transducer in the supporting platform. Standards 17 are attached to the supporting platform and not to the frame.

In a further embodiment force sensors 15 between support frame 10 and panel 13 can be replaced by a force sen- 35

sor in each standard 17 in order to measure not the weight of the person using the device but only the force transmitted to the standards by a person standing on the platform when said person pulls the standard or pressures against 5 the standards, respectively. In this case the vibrator can be controlled in an analogues manner as described above in dependence of the force exerted on the standards by the person standing on the platform.

CLAIMS

1. A device for vibratory stimulation on the human body comprising a support platform, a panel supported by said platform and forming a standing surface for a person using the device, two standards on the platform at opposite sides of the panel, forming handles for the person standing on the standing surface between the standards to hold on, which allow the person to increase and decrease the load transferred to the panel by the person standing on the standing surface, at least one sensor for sensing the load on the panel exerted by the person standing on the standing surface, a vibrator for imparting to said panel a vibratory movement, and a control unit for the vibrator, the control unit being connected with said at least one sensor and said vibrator for controlling the operation of the vibrator in dependence on the load sensed by said at least one sensor
2. The device as in claim 1 wherein said at least one sensor (15) is located between the support platform (10) and the panel (13) to measure the force acting on the platform.
3. The device as in claim 1 wherein a sensor is located in each of the standards (17) to measure the force acting on the standard.
4. The device as in claim 1 wherein the standards (17) are mounted to be collapsed against the panel (13) or be disassembled from the platform and to be locked in an upright position.
5. The device as in claim 1 or 2 wherein the height of the standards (17) is adjustable.



INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER

IPC7: A61H 1/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: A61H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5046485 A (SLATER), 10 Sept 1991 (10.09.91), figures 1-6, claims 1-11 --	1-5
A	US 5018510 A (SLATER), 28 May 1991 (28.05.91), figures 1-2, claims 1-12 --	1-5

 Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:	
"A"	document defining the general state of the art which is not considered to be of particular relevance
"B"	earlier application or patent but published on or after the international filing date
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"P"	document published prior to the international filing date but later than the priority date claimed
"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X"	document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y"	document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
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Name and mailing address of the International Searching Authority

European Patent Office, P.B. 5818 Patentlaan 2
 NL-2280 HV Rijswijk
 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
 Fax (+31-70) 340-3016

Authorized officer

Agneta Ånggård/EK
 Telephone No.

INTERNATIONAL SEARCH REPORT
Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5046485 A	10/09/91	US 5018510 A	28/05/91
US 5018510 A	28/05/91	US 5046485 A	10/09/91